House at Setauket, N.Y. (Messrs. Lamb & Rich, architects.)

A STUDY OF DOMESTIC ARCHITECTURE IN THE EASTERN STATES OF AMERICA IN THE YEAR 1896.

WITH SPECIAL REFERENCE TO QUESTIONS OF PLAN, CONSTRUCTION, HEATING, DRAINAGE, &c.

By A. N. Paterson [A.], M.A., *Godwin Bursar* 1896.

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THE first colonists carried with them to America not only the language, the laws, and the flag of the old country, but its architecture also. In what is now known as "Old Colonial" the visitor from England finds reproduced, with such modifications only as ensued from the general adoption of wood instead of brick or stone, the buildings of the time of Queen Anne and the first Georges. More than the language, perhaps, if not so much as the flag and laws, has the architecture been changed since those days. Influenced by new conditions of climate, of materials, and of class relations, and impelled by a constant and steadily increasing influx of wealth and demand for comfort, America, guided in later years at least by a body of able and highly-trained architects, has produced a type of house characteristic and original. While in many respects similar to, in more it differs from, our own. From an artistic point of view it is not less interesting; the best examples, if they do not surpass, are at least quite equal to the highest standard of work in this country. Regarded from the point of view of *convenience* and *comfort*—as is required by the Godwin Bursar—the type is distinctly superior to that common in England, and capable of teaching not a few lessons to those engaged in meeting the requirements of householders on this side of the Atlantic.

INFLUENCE OF CLIMATE.

Of the new influences which have modified the practice in America, the most important has probably been that of climate—the extreme variations of summer heat and winter cold: for to both of these extremes is ultimately due—paradoxical as it may sound—the more *open* type of plan which at once strikes the student as characteristic of the American house. The summer heat renders the American more susceptible to the other extreme; his "heat-producing centres" are not in such good working order as ours, as it was expressed by one of their medical men, and the cold in its turn being excessive, a general and complete system of heating has become an essential feature of domestic comfort, and therewith has modified in many directions the arrangements of plan.

PLAN.

Cellar.—In the first place the installation of a heating apparatus requires, as does also the malarial tendencies of the climate in many parts of the States, a cellar; and the cellar—while by no means general with us—is an indispensable feature in the American house in town and country. Being required by the heating arrangements, the cellar also plays a most important part in determining the character of the drainage scheme, while it may also be utilised to a certain extent for storage, though in general there is little room left for this in the completely equipped house—from the modern American point of view—when the whole of the extensive machinery in connection with the elevators, dumb-waiters, electric lighting, and ventilating plant, in addition to the heater and drainage, has been installed.

Draughts.—Again, the system of open fire-place heating in Great Britain tends, of its very nature, whatever be its advantages, to produce draughts, both within the room itself, and more particularly between room and hall, corridor and staircase, when, as is generally the case, these latter are not heated independently. Hence one of the first necessities in English house planning is to reduce to a minimum, consistent with convenience, the doors and other openings, and so to arrange them that draughts may be avoided. In the American house all parts are heated alike, and are kept at the same, or nearly the same, temperature, so that draughts are reduced to a minimum. The double door of generous width becomes therefore the rule rather than the exception, and these are generally, on the sitting-room floor at least, and except where special privacy is required, left open. A large double door with its leaves hinged, and constantly open, would be very much in the way, and hence the almost universal adoption of sliding doors.

The Hall.—In the smaller house this equable temperature has one effect of great importance, as it permits of the enlargement of the hall at the expense of the other sitting-rooms, which may be reduced in size, and also in number to two or even one. The increased importance of the hall, and the liberal allowance in number and size of door openings, combine to produce the *open* nature of the American house plan, which even a casual glance at a few examples on paper suffices to bring out as a prominent characteristic of the type. In actual use, as the result of the open vistas in all directions, while it takes away from the feeling of privacy dear to the Englishman, it gives a marked effect of spaciousness even to the smaller house. It is, as indicated, the direct result on one side of the system of heating employed; on the other, during the heat of summer, and with the furnace no longer going, this openness of plan has the advantage of allowing a thorough circulation of air entirely desirable under such circumstances. The same arrangement, in fact, which in summer cultivates draughts, in winter represses them. The natural heat during one part of the year renders openness desirable, the artificial warming during the remainder of it renders it possible, and in result it becomes the typical characteristic.

Verandahs.—More self-evident, as the result of climatic influence, is the large development of the verandah in all suburban and country residences. This characteristic feature in plan and elevation is, indeed, a first necessity. During several months of the year the piazza may almost be said to be the only habitable portion of the dwelling, and as, in consequence, it takes the place of the whole of the family sitting-rooms (with the exception of the dining-room) during summer evenings, a proportionate amount of accommodation and floor-space must be provided. The disadvantage which, in this country, would result from the overshadowing of the windows does not follow there, owing to the clear and penetrating nature of the light at all times throughout the year.

Bedroom "Closets."—Not so evident in its connection with climate and the heating

system is another typical feature—and an excellent one—of the American house plan, that of the bedroom closet, yet it is possible that to these are at least partially due its existence. In an English house of the middle class it may safely be said, I think, that a fire in the bedroom, and in the absence of other sources of heat, is an exception, except, perhaps, in the severest weather. It follows that during a great part of the year the room is too cold to be occupied by its owner except when in bed. The various members of a family have in consequence to be contented, during those hours of the twenty-four that are not passed in sleeping, with a share in the accommodation provided by the family sitting-rooms. That this is not the case in the United States is a generally recognised feature in the social life there. Bedrooms being as generally and naturally warmed as family rooms, they become secondary and independent sitting-rooms or snuggeries. This being the case, it is conceivable that clothes and clothes receptacles in the way of wardrobes, chests of drawers, &c., would become regarded as undesirable features in the room, and the natural evolution of the cupboard as an indispensable adjunct follows. In passing it may be noted that probably to the same cause may be traced that wonderful piece of furniture, on which so much American ingenuity has been bestowed, the folding bed. In the smallest class of house, where the bedroom *is* the sitting-room, and in the boarding house, where it is regularly used in this capacity, the desire is natural that the bed should take less space and conceal its ordinary functions behind the elegant exterior of a quasi cottage-piano or bureau! The "closet," then, is a feature that cannot be overlooked in considering the American house plan of to-day. In the smallest suburban house no bedroom is complete without it, even if the accommodation has to be cut out of the floor-space of the room. In the larger house they are frequently of considerable extent, and are fitted up elaborately with drawers, trays, shelves, hooks, and more ingenious appliances for storing, each in its proper place, the various articles of wearing apparel. As already said, the whole forms a most excellent and convenient arrangement when properly made use of. An undoubted, and, to some extent, natural tendency exists, I noticed, to utilise it as a place to stow away anything that may for the moment be wanted out of sight, from soiled linen to portmanteaus. The accumulation that results renders the convenience doubtful, the desirability of it as a feature in a plan of questionable merit. Even with this tendency, however—for which the architect can scarcely be blamed—the matter may be largely put right, and frequently is in the better and more complete houses, by the provision of a separate closet opening off the bath-room or neighbouring corridor, with a window to the outer air, for all the soiled linen of the household—and possibly a shoot to the laundry—as well as sufficient storage room for trunks and other impedimenta, leaving the bedroom cupboards for the orderly arrangement of each individual occupant's clothes.

Service Rooms.—To class relations rather than to climate is due another marked feature in the American house plan—the simplicity and directness of the service arrangements, together with the extensive use of labour-saving appliances of all kinds. One of the leading architects in the States, and one largely occupied in domestic work, made the remark concerning this, that the one feature in the English house plans as published which rendered them inapplicable to American practice was the isolation of the servants' quarters, with the long routes that in consequence had to be traversed, especially between the kitchen and dining-room. Professor Kerr's dictum as to the separation of the two communities of family and servants, however applicable it might be in the old country, he declared to be impossible in the new. There, the number of domestic servants is fewer, their efficiency less, and, in consequence, everything must be done towards simplifying and saving labour. The care which the architect devotes to this point will be more evident when we examine in detail some of the plans which follow, and it will be seen that here, too, we have a typical and—in view of

the increasing difficulty of the domestic-servant question in this country—a valuable feature in the American house plan. Further matters of detail which might be referred to now will be better appreciated when studying the individual instances. These fall into the natural divisions of town, suburban, and country residences.

The Town House.—The main problem involved in the satisfactory planning of the town house, that of securing sufficient light with a restricted frontage, is, in one respect, at least, not so difficult of solution in America as in England. The restrictions of site are not less—in New York the average city lot is 25 feet by 100; but the much greater brilliancy of the light renders it possible to cover a more extended area while depending on front and back light only. A further assistance is rendered by the openness of plan and absence of corridors already commented on.

Self-contained Houses.—Of the various types of town houses we shall first take one or two examples of the self-contained residence. Within recent years a marked change has been effected in the general type of plan. The "Old Colonial" arrangement, still seen in thousands of instances in the "brown stone fronts" of New York and Boston, was, with little change, that to be found in the older squares of London: a half-sunk basement, with a parlour to the front and kitchen offices to the back, a steep flight of steps from the street (in America the "stoop") giving access to the main door on the ground floor, with its narrow hall or lobby and still narrower stair, and with front and back rooms communicating with each other by double doors. Apart from the ugliness and inconvenience of the lobby and stairs, the unprotected flight of outside steps was ill-adapted to the requirements of a country subject to prolonged spells of snow in winter. Accordingly, in the arrangement now prevalent, both in new work and, by alteration, in the old, and generally known by the terms "American basement" and "English basement" (in the former the kitchen is on the ground floor level, with the dining-room over, in the latter the dining-room is on the level with the kitchen below), the "stoop" is done away with, an entrance hall and reception room are obtained on the street level, or sometimes even a step or two below it, occupying the position of the old parlour, and the stairs are thrown back to the centre of the house, with, in some cases, a cupola light over. A completely sunk basement underneath contains the heating chamber, &c. Such is the arrangement of the self-contained house of average size; the city palace, as it might be called, of the wealthy, conforms more to the European model, with American characteristics confined to matters of detail. The pair of houses now being built at Madison Avenue and Seventy-second Street, by Messrs. Kimball & Thompson, architects [fig. 1] illustrate both of these types. The large house, with its frontage to the Avenue of over a hundred feet, and its corner site, is subject to little or no restriction as to light, and is planned on spacious and symmetrical lines, with the evident end in view of stately and lavish entertainment; the small house, with frontage of 18 feet only, is a typical "English basement" arrangement. Both show, as do in greater or less degree all the subsequent plans, the *openness* of arrangement already referred to. In the former, the bowling-alley may be noted as a somewhat unusual extension of the entertainment provided in a private residence. The two upper floors contain the bedrooms, the principal bedroom with its "closets" and dressing-room occupying the same area as the drawing-room, with, in addition, a large ball-room on the top storey. In the smaller house may be noticed, besides the characteristics already referred to, the hall and staircase, on both entrance and upper floors, lit *only* from the front and back, and also the invariable service pantry between the kitchen and dining-room. The bedrooms on the second and third floors are front and back, with the bath-rooms and w.c.'s in the centre. These latter are lit and ventilated only by a glazed well with skylight at the roof level, an objectionable arrangement at the best, but one common enough in the States, where, however, it must be added, the system of general heating largely overcomes

what would otherwise be a defect. Hot-air inlets or radiators being excluded from the w.c., and the apparatus ventilated by an air-shaft led into the kitchen or other generally heated flue, the air direction from the rest of the house is always inwards; and from practical experience, neither in such apartment nor in the lobby outside and with the door left open was there any trace of objectionable odour. The basement here being devoted entirely to kitchen offices, a sub-basement has to be provided for the heating chamber, drainage, &c. Its floor is 20 feet below the street level, and in a wet subsoil, so that a complete system of open drains had to be laid under the floor, connected with a gathering well in the centre of the boiler room, from which the water is raised by a small electric pump, and thence delivered to the main sewer.

Groups of Houses.—An ingenious group of six small self-contained houses, erected to the designs of Messrs. Little & O'Connor, on a corner block, 100 feet square, in New York, is illus-

FIG. 1.—PLAN OF TWO HOUSES, MADISON AVENUE AND SEVENTY-SECOND STREET, NEW YORK. (Messrs. Kimball & Thompson, architects.)

trated in fig. 2. It is one of several such blocks recently erected by them, so arranged as to give each house its "backyard," and what is of greater importance, an ample supply of sun and air from the back. Of such independent groups of houses many interesting variations are to be seen in New York.

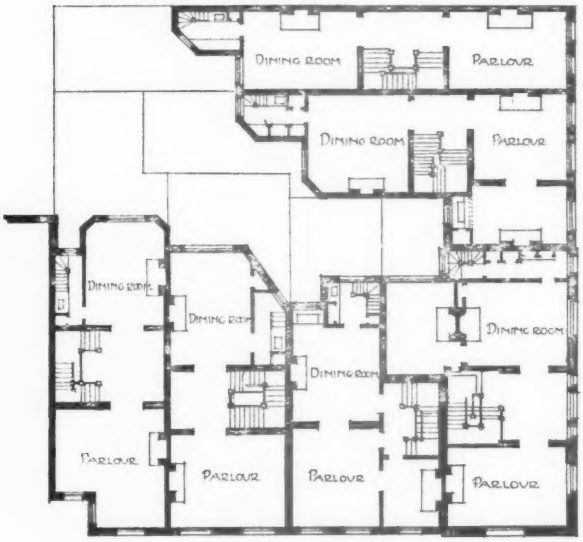

FIG. 2.—BLOCK OF SMALL SELF-CONTAINED HOUSES, NEW YORK. (Messrs. Little & O'Connor, architects.)

Washington Examples.—As regards the self-contained residence, the other cities visited, with the exception of Washington, offered little variation in plan from the types already noted. The capital, however, well described as the "city of magnificent distances," having been laid out from the beginning on a regular plan—which has been likened, from the lines formed by the streets, to a wheel laid over a grid—furnishes a great variety of wedge-shaped and other special forms of building sites. Space is at the same time much more liberally distributed to the individual lots. The climate approximates more nearly to that of the Southern States, and renders necessary, in consequence, an even more airy and open type of plan. As the result of these influences the city house of Washington has generally much of the "suburban" character as well as certain special features of its own. The Davidson house [fig. 3] offers a typical example from a number designed by Messrs. Hornblower & Marshall, architects, Washington. It is not a particularly large or important house, but in it the *art* of planning is admirably exemplified, the very awkwardness of the site being turned to advantage, and that with due regard to the scale, proportion, and a certain symmetry in the disposition of the apartments. Washington is in a brick country, and in most of the later examples of domestic work this material has been employed in a natural and simple manner, and with a fine reticence in design, which, as yet, can scarcely be said to characterise markedly American architecture in other centres.

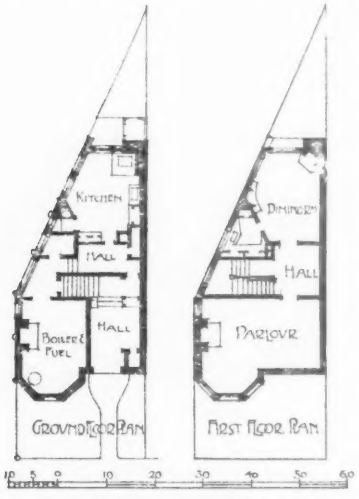

FIG. 3.—DAVIDSON HOUSE, WASHINGTON. (Messrs. Hornblower & Marshall, architects.)

The Apartment House.—The apartment house is, as is well known, a characteristic feature of modern life in the United States, and particularly in New York, where, owing to the enormous value of land, and the almost entire lack of "suburbs," it forms the only style of dwelling procurable by those of comparatively moderate means. "The Wellesley," Eighty-first Street [fig. 4], is a building of this nature, which I had the opportunity of visiting when almost completed, in company with one of the architects, Messrs. Little & O'Connor. It is

seven storeys in height, and occupies an area of 120 by 100 feet, while so planned as to form, with three other identical buildings, a complete block four times the size of that now erected. Entering direct from the street is the public hall, with porter in attendance, a clerk's office, and ladies' boudoir, and cloak-room, for the use of callers and visitors, furnished, as might be expected, with an "elegant" cheval glass. A passenger elevator takes us to the upper floors, on each of which are four houses of six apartments and kitchen offices, all entered through an inner vestibule from the upper public hall. The reception rooms are all arranged *en suite*. By a separate goods entrance on the ground floor, and thence by electric dumb-waiters, supplies are delivered directly into the kitchen of each house, the opening from the shaft to the kitchen being closed, as required by the Building Act, with an iron door. From the basement, where the whole of the machinery is in charge of a resident "engineer," heat is laid on to all rooms by means of steam radiators, and also a freezing mixture pumped to the refrigerators in each house, so that, with the fires adapted for gas only, neither coal nor ice need be included in the domestic supplies, and the lifts are freed from the transport of such objectionable materials. Each house is supplied with separate metres for gas and electric light, but these are likewise lodged in the basement in care of the attendant. The doors throughout are sliding, to secure economy of space, which, indeed, is the ruling motive throughout, both in plan and construction. On the roof are situated the washing-houses, one for every three houses, so that each may secure its use during two days of the week. These are supplied with enclosed steam driers, while the remainder of the flat roof is divided into sections for open-air drying, each section being surrounded and covered in with wire-netting. The dumb-waiters are continued up to the roof for the delivery and return of the linen. While the plan is admirably arranged to secure as free entrance as is possible of sun and air, it is natural to find that, with the exception of the ground floor, with its special advantage of convenient access, the rents rise in direct proportion to the rise in elevation. Those of the houses described were not at the moment obtainable; but I was provided, by the courtesy of the proprietor and architects, with a schedule for a similar block in the neighbourhood, though not quite so modern and complete in design, and with slightly less accommodation. There the rents varied from 1,200 to 1,450 dollars—£240 to £290—for from five to six rooms and kitchen—giving a total of about £7,000 for the block—and this far "up town," at a distance of about five miles from the business centres. This, it must be remembered, of course, includes the enjoyment of the common services of the clerk, porter, engineer and boudoir, with taxes, and supplies of heat and freezing mixture *ad lib.* The larger and more famous

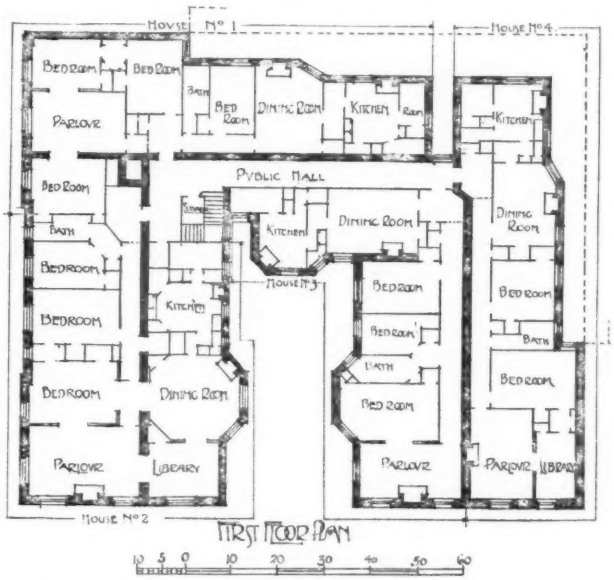

FIG. 4.—WELLESLEY APARTMENT HOUSES, EIGHTY-FIRST STREET, NEW YORK.
(Messrs. Little & O'Connor, architects.)

apartment houses, such as the "Dakotah" and "Vancorlear," designed by M. Hardenbergh, architect, the former of which I visited, are but larger and more sumptuous editions of the type just described.

Workmen's Houses.—One more phase of domestic architecture in the city must be briefly alluded to, that of houses for the working classes; of these on modern lines, New York, at least, is much in need. Than the airless, backyardless tenements with which the lower portions of that city are crowded, each on its lot of 25 by 100 feet, and of which in actual buildings it covers fully 80 per cent., nothing could be more vicious from a sanitary point of view. Efforts to better matters have recently been initiated, among others, on the lines proposed by Mr. Ernest Flagg, architect, who has published a pamphlet on the subject. His improved plan deals with areas of 100, 75, and 50 feet wide respectively, by the usual 100 feet deep; but even with the enormous ameliorations introduced, his central court is only 30 feet wide, and his side wells—open to the front and a half contributed by each adjoining tenement—18 feet, while the buildings, if with no more than six storeys, would be at least 60 to 65 feet high. Such conditions as regards light and air, though effecting a very revolution on the previously existing state of affairs in that "land of freedom," would not be tolerated in this "class-ridden" little kingdom, where, as provided in the Buildings Act of my own city of Glasgow, with all its crowding, a free space of three-fourths the height of its wall is required opposite every dwelling-room window. In the other cities visited, where the geographical restrictions as to area, with which New York is hampered, do not exist, the condition of affairs is vastly better, and in Philadelphia in particular, the "city of homes," as it is proudly called, there are miles of admirably planned two-storey and basement "model" houses. These, however, are more of the nature of "lower middle-class" dwellings than actual workmen's houses, and it is only by virtue of low ground annuals, and an extended trolley-car service, that they are rendered possible. In New York, a large "Workmen's Hotel" or model lodging house was, at the time of my visit, in course of erection for Mr. D. O. Mills to the design of Mr. Flagg. It is of the same type as the Rowton Houses in London, and as these are well known here, I propose—in view of the limited time at my disposal—to omit the description of the American example.

The Suburban House.—For an illustration of the Suburban House at its best, in Eastern America at least, one turns naturally to Boston, with its magnificent suburb of Brookline. Distant about four or five miles from the centre of the city, but connected with it nearly all the way by a series of parks, the character of the surroundings is little changed on entering the suburb. On the sloping hillsides, covered with fine turf, and amid frequent groups of trees, each house is surrounded by its own lawn and flowering shrubs, bordered only by the footpath of the public road, and generally without railing or fence of any kind. The houses, mostly of large size, are constructed of every material; but the great majority are timber-framed, and covered with matchboarding or shingles. The varied but subdued tones of the latter, left in its natural colour or stained, with the brightly painted woodwork and stucco facings, the brick or stone chimneys and gable ends, impart a charm of brightness and gaiety to the whole surroundings. Just such an effect is again to be met with in the Melrose and Oak-lane districts about Philadelphia, or, on a smaller scale, at Rowland Park, near Baltimore. Of one of the Brookline houses, that of a banker of Boston, of hospitable memory, designed by Messrs. Hartwell, Richardson & Driver, of Boston, I am able, by their courtesy, to give a complete set of plans [fig. 5]. The house stands in about half an acre of ground, and has nearly 100 feet frontage. While the view is open and pleasant all round, the ground slopes rapidly to the back, and the outlook thence affords, south and west, a magnificent panorama of the city and harbour. Hence the placing of the principal drawing-room and circular

piazza on that angle. The construction is timber framed and clapboarded, with shingled roof. The plan readily explains itself, and admirably illustrates the special characteristics referred to on an earlier page, the free and open nature of the arrangement, the wide door-

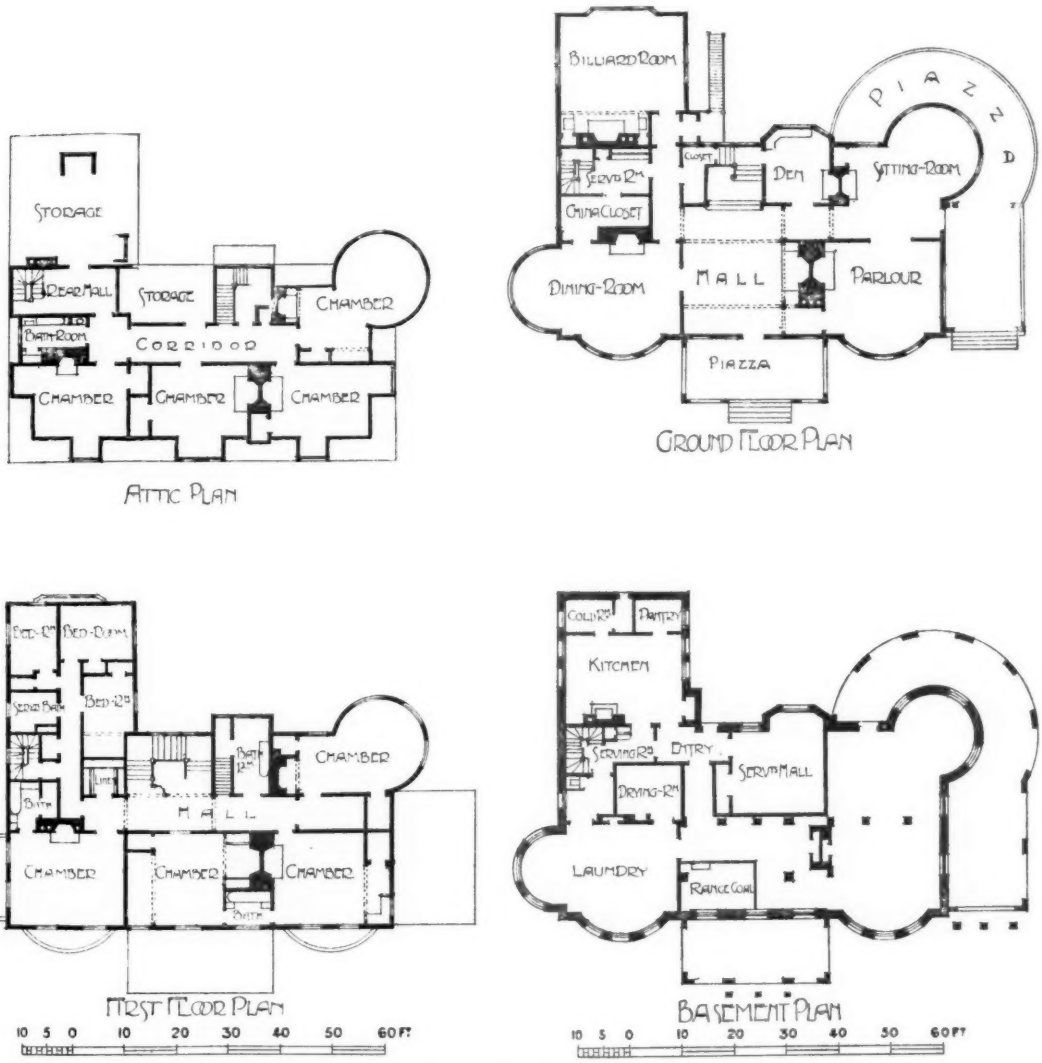

FIG. 5.—PLAN OF HOUSE AT BROOKLINE, BOSTON. (Messrs. Hartwell, Richardson & Driver, architects.)

ways, affording vistas in all directions, the carefully planned service arrangements, the extensive bedroom cupboards—the family bedroom in the south-east angle has two—and an immediately adjacent bath-room. The billiard-room is isolated in the south-west wing, and similar seclusion on the floor over is obtained for the servants' sleeping-rooms, in close connection with the service stair. The large central hall, with generous chimney-corner—the

fireplace of brick carved delicately in flat relief—and wood panelled walls, is freely used as a sitting-room, though opening directly into the front porch.

The Country House.—The Country House proper, as it is understood in England, the family home, of which the town mansion, if it exist at all, is but an offshoot and temporary convenience, may be said, with rare exceptions, and these mainly in New England, to have no existence in America. Such may be found also, it is true, among the "Old Colonial" mansions of the Southern States; but the country house of the wealthy American is in general a place for summer resort, a *pleasaunce* rather than a home, and to study the type one must go to a fashionable watering-place, and above all others to Newport. There may be gathered some idea of the variety of the American plutocrat's tastes in domestic architecture.

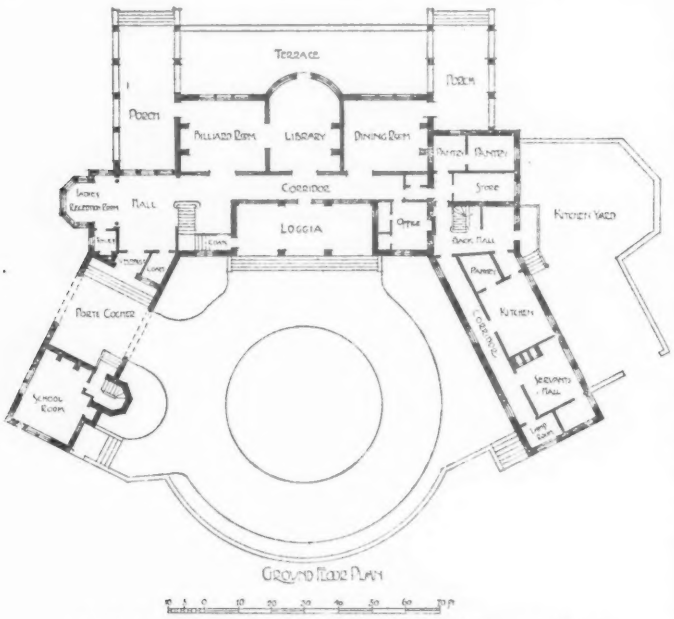

FIG. 6.—SHAMROCK CLIFF, NEWPORT. (Messrs. Peabody & Stearns, architects.)

Newport suggests, indeed, nothing so much as an outdoor museum of the styles, historical and otherwise. In the miles of avenues which intersect in every direction on Prospect Hill, may be seen, mingled with typical American framed houses, weather-boarded and shingled, stained and painted in every colour, gabled and turreted as to roof and spreading wide with piazzas, *François-premier* châteaux from the Loire, half-timbered and tile-hung cottages from the neighbourhood of Hampstead Heath, contrasting with sober grey stone manor houses from the West Riding of Yorkshire, and backed by a white marble palace—on a half-acre lot—which, with its octastyle Corinthian portico, is naturally taken, at first sight, to be a museum or local court of justice. Nor is the Italian Villa unrepresented, nor the unmistakable *Beaux-Arts* rendering of the same motive; while the crescendo of extravagant outlay reaches a climax in the latest of the number, the stately mansion of Cornelius Vanderbilt, a second Chatsworth, with its four hundred rooms and total cost of four million dollars, its wrought-iron gates weighing three tons, its white marble gate piers and porter's lodge—in reality housing the boilers and heating apparatus—situated within fifty yards of the *porte cochère*. Yet many of the houses, individually, are full of interest both in plan and design. By the courtesy of the architects, Messrs. Peabody & Stearns, of Boston, I am able to exhibit [fig. 6] the ground plan of one of the most typical, Shamrock Cliff. Its general disposition, with the "drive-way" passing through and under one of the projecting wings, and its suite of reception-rooms with terrace and porches overlooking the sea, is at once picturesque and stately. On the upper floor the family bedrooms and guest-rooms occupy the centre, the nursery accommodation the whole of the left wing, and the servants' quarters the right

wing. The walls are of stone throughout, lined with brick, and the roofs are covered with Italian tiles. While the main part of the building is only two storeys in height, the end of the left wing rises in the form of a lofty and massive tower, with open gallery under the wide spreading eaves. The total length of the buildings measured across these wings extends to 172 feet. In the country house of Mr. Chas. J. Bonaparte, near Baltimore, by Messrs. Wyatt & Nolting, we have a return to the more simply domestic feeling, with, at the same time, a certain spaciousness and dignity which suggest the south. The great reception hall, continued across the whole width of the house, but divided on occasion by curtains, while only possible under such climatic conditions as those of a southern, or at least border, State, gives an air of nobility to the whole design. A similar effect is produced in the elevation, and the position of the hall well marked, by the great projecting portico, with Ionic columns rising through two storeys and crowned with a pediment. In the house at Ridgefield, Conn., by Messrs. Adams & Warren, we have an example of the small country house, simple, well-arranged, compact, yet with the characteristic American spaciousness shown in the airy central hall, not only on the ground floor, but on the upper bedroom storey as well; while a still smaller example by Mr. Alex. McIntosh well illustrates an American bungalow or small summer retreat.

CONSTRUCTION NOTES.

As might be expected with a progressive people like the Americans, upon whom the old ways sit lightly, since tradition in craft as in art is but a thing of yesterday, fireproof construction is now very widely made use of in all kinds of buildings, including domestic work. The steel framed construction by which alone the "tall buildings" are rendered possible is to-day a factor of the greatest influence, and one, I believe, of more general effect than the American architects recognise. The tall buildings themselves offer an interesting subject for consideration, but one that must be set aside as beyond our present scope. Suffice it to say that this system of constructing a building on the principle of a steel cage, divided horizontally into layers, as may be convenient, with no internal supports to speak of, and the whole sheathed with an apparently—but utterly sham—constructional skin of granite, stone, brick, or marble, is influencing in a hundred ways, though often unconsciously, the architect's point of view in plan and design, in domestic as in other buildings. Take a solitary instance of this. The stone corbelling under the projecting oriel, a feature constantly recurring in the *François-premier* houses of New York, is in nine cases out of ten a sham. The window mullions, themselves probably formed of stone sheathing round a steel core, are carried by steel cantilevers bolted at the back into the girders of the floor below, and the correctly designed and jointed corbel courses with difficulty carry their own weight. But what will you, says the architect, with stone at a dollar-and-a-quarter a cube foot? And the same excuse is sufficient for cornices, designed as for stone, and executed with steel, concrete, or wood framing, covered with copper or galvanised iron, and painted. Yet the same house must have its marble, mosaic, and hardwood finishings, at a cost ten times that which would have sufficed for making the construction honest. The influence, in short, seems to me to be wholly pernicious from the point of view of sound architecture, and the architects, while they admit it, find the prevailing tendency in most cases too strong for them. The details of the steel framing system for walls have already been frequently described, and need not be further commented on here. The system of sheathing which accompanies it is not, in the principal cities at least, confined to steel framing, for in nearly every case the outer wall surface is of this nature. The walls themselves are built of brick, by the various building laws, of specified thickness according to height, and without reference to the covering, which is but a skin, be it of stone, Tiffany brick, granite, or marble, of from 4 to 9 inches in thickness.

Securely tied to the wall behind with iron or copper batt-bolts, or in the skeleton frame carried from storey to storey by projecting flanges, it has not even its own weight to support, and the elaborate architectonic treatment of bold rustication, corbelled courses, columns, pilasters, and voussoired arches borrowed from an earlier architecture of solid and honest construction, becomes, in such cases, much the same in nature as a set piece on the stage.

For roofs, floors, and partitions, fireproof construction is now generally adopted in all important domestic work in the cities, but in detail it differs little from that common in more important buildings in this country. Floors for houses, however, being generally of less area and subjected to lighter strains than those of public buildings, lightness and cheapness become important desiderata in their design, with a consequent abandonment of the elaborately constructed terra-cotta arches between the girders common in this country. In this connection, floors with tension members are coming much into vogue. In the construction of flat roofs an extensive use is made, in combination with other materials commonly employed here, of "roofing paper" or felt, laid in several thicknesses and bedded in tar. Most commonly the outer skin is of copper, laid either directly on the concrete, or on wood and felt, in sheets 12 inches by 24 inches, and with soldered joints. This material is also largely employed, as already mentioned, for sheathing cornices, wood or iron-framed bay windows, &c., sometimes with excellent results artistically, and, with galvanised iron or tin as an alternative, for aprons, ridges, and flashings, where lead would be used in this country. Partitions are commonly built of hollow blocks of porous terra-cotta. Tiles of similar type are used for casing structural steel-work, and in some cases instead of lathing on the internal wall face. Thin fireproof partitions, finishing from $1\frac{3}{4}$ inch to $2\frac{3}{4}$ inches in thickness, are much in favour from the saving in space effected. These are mainly constructed by using channel or flat bars, with expanded metal lathing or burlap between, plastered with hard setting mortar on both sides.

For country and suburban houses, timber framing covered externally with clapboarding or shingles, is the method of construction almost universally employed. The half-sunk basement storey containing the heating apparatus is of stone or brick, as likewise are the chimney flues and stacks, with occasionally the whole of the gable containing these. Not infrequently the favourite boulder-built type of walling is carried up in the form of rough piers supporting an overhanging upper storey or verandah roof. It comes with rather a shock to find in such a case that the apparently massive rough-hewn pier may be, like the more elegant columns and pilasters of the city front, but a sham after all, an affectation alike of strength and rusticity, with a steel stanchion for core to do the actual work. An instance of this which came under the writer's observation was, however, it must be admitted, in the near neighbourhood of New York. The timber framing of the outer walls is, in the great majority of cases, extremely simple and slight to our notions, and, as seen in the course of construction, the buildings suggest nothing so much as an enlargement of the little wood cages of the itinerant bird-seller. Vertical framing 4 to 6 inches by 2, at 15-inch centres, with heavier corner posts, and rails at the level of intermediate floors and wall-head, with an occasional row of horizontal struts, would seem little likely to withstand severe wind pressure; but the strength to resist such forces is obtained when a further stage in the construction is reached, by the inner of the two outside coverings in the form of $\frac{7}{8}$-inch boarding put on diagonally, and well nailed to each row of framing. Over this again is laid the clapboarding or shingles, with, in good work, a layer of felt or rosin-sized paper between. While in the cheaper type of house the inner side of the framing is simply lathed and plastered, there are various expedients in superior work for rendering such walls more impervious to heat and cold. Of such are lath and plaster on fillets set midway in the framing, a layer of dried

sea-weed quilted between two layers of waterproofed paper, nailed all over the inside, battened on the top and then lathed and plastered, or, most substantial of all, lath and two-coat plaster, then battens, and the whole finished with lath and three-coat plaster in the ordinary way. Wood shingles, though but little employed in this country, are too well known to require detailed description. When left their natural colour, or simply stained, the effect artistically is excellent, and their weather-resisting qualities in the generally dry climate of America entirely satisfactory. When painted they are reduced to the level of tin scales. Various species of wood are employed, of which perhaps the most effective is cedar.

Akin to the system of double outer sheathing of the walls is the double flooring generally adopted. The under flooring consists of $\frac{7}{8}$-inch spruce boarding in 6-inch to 8-inch breadths laid diagonally. This is laid down as the building advances, and renders the further stages of the work much more easy to carry on. It has the further advantage of allowing all lying pipes to be carried along the floor without cutting the joists, and over iron joists flush with these. The finished floor, be it of ordinary boards or parquetry, is laid down as the last stage of the building, and thus escapes all possibility of injury from the other tradesmen.

HEATING.

A complete system of heating is considered in the United States to-day to be as necessary a feature of the modern house as a system of drainage. That we, on this side of the Atlantic, should be content with open fires produces upon Americans much the same impression as does upon us the apathy of some of the more outlying countries of Europe and the East concerning modern ideas of sanitation. That the heat radiated from an open fire is the pleasantest and in some respects the most healthy may be admitted; but its inadequacy and irregularity is unquestionable, and its extravagance, with something like 85 per cent. of the heat produced discharged to no purpose up the chimney, is appalling. To trace the gradual development of house heating in America would be interesting, but beyond our present scope; the final result to-day, whichever be the system employed, leaves little to be desired, except perhaps a modification in degree. The high temperature, so generally the subject of complaint on the part of visitors from England, is, however, a local accident, the result of the American climate and constitution, and not an essential of the system. The same or similar plant which there produces an equable temperature of 70°, could here with equal or greater facility and with less consumption of fuel maintain one of 55° or 60°. The systems mainly employed are three: steam, hot-water, and hot-air. The two former may be direct or indirect—that is to say, the heating surface may be in the room, or may be placed elsewhere to heat the air which is ultimately led into the room. Direct and indirect may, and frequently are, both combined in the same system; and, finally, any two of those mentioned, or even all three, may be associated in the heating of one house. To study the details of steam and hot-water heating, one does not require to go out of England; they are commonly employed in public buildings of all kinds and sizes, and in many of the larger houses, and the details in the manner of installation differ but slightly here and in America. Warming by hot air, on the other hand, being essentially a system applicable to small areas only, is practically unknown in this country, while for all houses costing about 6,000 dollars (£1,200) and under, it is practically universal in the United States. I shall therefore omit any detailed description of the two former systems, and, after a brief reference to one or two special forms of installation, pass to a consideration of the modern hot-air plant. Before doing so, however, it may be briefly noted that in the smaller class of city houses, in apartment houses and hotels, where the limitations of space render a multiplicity of air flues embarrassing or impossible, and where its superior cheapness is of importance, direct radia-

tion, either by steam or hot water, is the universal system of heating employed. Of the two, steam is the cheaper and commoner, as well as the more efficient, in case of extreme cold; but it has the disadvantage, among others, that there are no means of modifying the heat. In consequence, for all the better classes of work where direct radiation is in use, hot water is the means invariably adopted. In some cases, however, the installation is so arranged as to suit either steam or hot water, the latter being employed under ordinary weather conditions, the former during periods of abnormal cold. In all the more luxurious and expensive city houses indirect radiation is the invariable system. In it the air, admitted through openings in the cellar walls, from which it is conducted by wood-boarded or galvanised iron shafts to iron or brick chambers, is there heated by radiator "stacks" suspended from the ceiling, and thence rises by virtue of its increased rarity to the various rooms above, into which it passes through the registers in floor or partition. In the largest mansions the assistance of an electrical or steam-driven fan is invoked to regulate the distribution of the heated air, which is also screened and moistened as required. It must not be supposed, of course, with all this that the open fire upon which we pride ourselves is unknown in America. The fireplace, in fact, is as general a feature in the American as in the English house, but its functions are considerably modified. As a heater it is of minor importance—the circumscribed space round the hearth is no longer the only habitable portion of the room of a winter night—but it remains as a most effectual, and generally the only, ventilator, while it is valued as much there as here for its cheerful appearance and the decorative character of its surroundings. An appreciation of these altered functions is necessary to explain, though perhaps not altogether sufficient to condone, the construction (very exceptional it must be admitted) of the fireplace in the principal bedroom of a house which came under my observation while in course of construction. Jambs and lintel boxed out with lath and plaster, tiled hearth laid over a wood floor, and flue consisting of 5-inch tin piping, are compatible only with the use of the popular "gas-log," which, like the Scottish Church, might take for its motto, "Nec tamen consumebatur."

A recently erected block of "Dormitories," or students' residences, at Harvard University, which the writer had the pleasure of visiting in company with one of the architects, Mr. Sam Meade, of Boston, is heated on a system peculiarly suited to the arrangement of such a building, consisting as it does of many comparatively small and private rooms, and, along with these, extensive hall ways, staircases and lavatories, readily under the control for heating of one attendant. For the latter direct steam radiation supplied by one boiler and piping system is employed, while the studies are fitted each with its own "ventilating" grate, with hot-air chamber and fresh-air supply from outside, the heated air from the grate-back passing into the room. Such a system would seem peculiarly applicable to the more moderate heating requirements of this country. In the neighbourhood of Boston, also, on a building estate at Brookline, an extensive application of steam-heating from a central power station was also the subject of study. The estate consists of about twelve acres of naturally sloping ground. At the lowest point is placed the boiler-house, while disposed on roads running in various directions have already been built, besides a club-house and an extensive range of stables, eight "terraces," or "crescents," consisting of sixty-three four-storey self-contained houses, leaving room for further extensions of a like number. In the boiler-house are five boilers, with a total of 950 h.p.; but while the power of these may be combined for use in the severest weather, in ordinary circumstances only three are employed—two with a single 6-inch main for six of the terraces, and one with separate 3-inch mains for the other two. By reason of the fall of the ground, one pipe in each case serves for flow of the steam and return of the condensed water; but the highest terrace, about

30 feet above the power station, requires a main to itself, to prevent the steam supply to its lower situated neighbour being choked off by the return. The longest run of pipe is about an eighth of a mile to the farthest house, and in order to prevent loss of heat a very complete system of isolation and packing is required. After many experiments the method adopted [fig. 7] consists of a foundation of concrete and brick, with the half of a 14-inch glazed ware pipe jointed with cement laid over it. The pipes being laid through this, the surrounding area is packed with mineral wool. The pipes have expansion joints every 14 feet, and the trench is supplied at intervals with wells for collecting gathering water, and man-holes for access to the same. The main enters each terrace at one end, and passes longitudinally to the other. As it passes through the cellar of each house it is connected by a valve with the house main and its radiators. In the earlier houses the indirect system was adopted throughout, but the more recent ones have indirect on the two lower floors only, and direct radiators on the less important upper storeys. From each house an electric indicator communicates in case of need with the engineer in charge at the power station, who, besides, makes a daily round to see that everything is in working order. The rent charged to each house for its heat supply is at the rate of one dollar per foot of frontage per month, making, for an average house of 25 feet frontage, about £30 for heating during the six months in which it is required. This is a very considerable saving on what similar heating would cost for each house were it separately installed, and, indeed, very much less than what would be spent in this country in warming a house of similar size, especially if the calculation be made on the basis of the number of heat units supplied. It is interesting to note that the fuel found most efficient as the result of experiments is a mixture of soft Cumberland coal and anthracite, in the proportion of one to two.

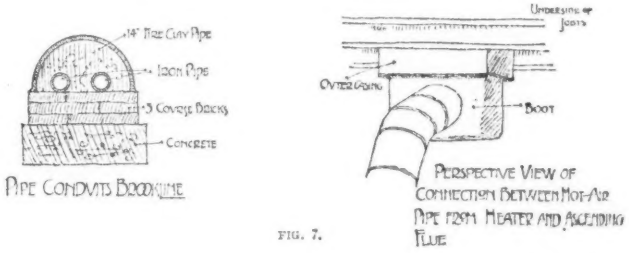

FIG. 7.

Hot-air System.—The hot-air system, as already mentioned, is almost universal in the smaller class of houses, especially in the suburbs and the country. For residences of eight or ten rooms, covering an area of not more than 1,200 square feet, it is found to form an entirely satisfactory method of heating. It is limited to buildings of this size (unless more than one furnace be employed) on account of the difficulty of getting the heated air to travel *horizontally* more than 15 to 20 feet, especially where under the influence of outside wind pressure. Its first cost is much less than that for a steam or hot-water system, and averages, for a house of the size mentioned, when done in the most satisfactory manner, 500 to 600 dollars. Such defects as are at times encountered—overheating of the air, or its vitiation by the gases of combustion, and unequal distribution of the heat—are entirely due to unsatisfactory or inadequate-sized furnaces, or unskilful or careless setting and workmanship generally. The three constituents of the system are the furnace itself, the distributing hot-air flues, and the cold-air supply.

The Furnace.—In principle a hot-air furnace is simply a stove enclosed within an outer jacket of brick or iron, forming an air chamber between the heater and the casing; but as the result of many years of experience and study, the various makers have introduced many refinements and improvements in the direction of greater efficiency. Furnaces are now made of cast-iron, wrought-iron, and steel, either singly or combined, and are supplied ready for setting down on the floor of the basement and connecting with the various shafts. In the

Eastern States anthracite coal is universally employed, in the Western, soft coal; for each a special make of furnace is put on the market by the principal makers, several of whom are to be found in every large centre. To describe any one of these furnaces in detail is impossible within our limits; one or two points common to all the best may be noted. The "fire-pot" is furnished with a shaking or dumping bottom to clear the furnace of ashes; for soft coal a hot-air blast is introduced to render thorough the consumption of the fuel and reduce the smoke emitted. The smoke, after leaving the combustion chamber, requires to travel once or more round the radiator before reaching the chimney. The radiating surface is made as large as possible by the introduction of a series of drums or tubes, and the outer casing, whether of brick or metal, is made double to avoid loss of heat. A water-pan is a usual feature to counteract a tendency to excessive dryness in the heated air. Such a furnace, when efficiently heating a house of the size mentioned during all but the coldest weather, consumes an average of two tons of anthracite coal per month. It requires feeding twice in the twenty-four hours, while a bucketful of water once a day suffices to keep the water-pan supplied. The writer spent many hours in several houses warmed on this principle, and found the heated air entirely pleasant and quite free from the defects usually attributed to stove heat. The furnace should be set about the centre of the basement, but a little nearer that side of the house on which blow the prevailing winds in winter. The tendency of the wind is to carry the warmed air in its own direction so as unduly to supply the rooms on the lee side of the house to the impoverishment of those on the windward. By setting the furnace as described the nearly horizontal shafts are shortened, and the flow made easier in the direction where it might otherwise be unsatisfactory, and *vice versa*.

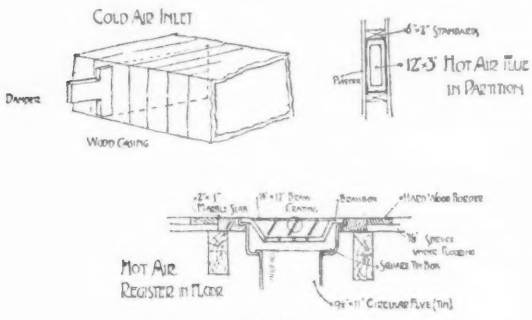

FIG. 8.

Cold-air Supply.—The cold-air supply, as it is called, is brought to the furnace by a duct connected with a screened opening in the outer wall, as high above the ground as possible, and therefore generally placed immediately under the ground-floor joists. As the air has to be introduced under the heater the duct is either carried down the outside wall and thence under the cellar floor in a stone, cement, or tile-lined flue, or along the ceiling in tightly jointed boarding to a point near the stove, where it descends to the "cold-air pit" under the same. It is supplied with a damper [fig. 8], by which, in extreme weather, it can be closed and the air drawn either direct from the cellar, or, better, by a shaft connected with a register in the outer hall. Its area should be equal to almost 80 per cent. of the total areas of the hot-air flues. The outside opening is placed on the windward side of the house, but in very exposed situations it is better to have two, connected with the same shaft, and with dampers so that either can be used alternatively.

Hot-air Flues.—The hot air is carried from the crown of the furnace in circular tin pipes, either doubled or covered with asbestos paper, and called "leaders." These, which should have a rise of at least an inch for each foot of run, are connected with the lower end of the rising flues, called "stacks," by a junction called the "boot." The stacks, which are likewise of tin, are made double for good work, with an air space between the outer and inner casing. These are frequently made in flat sections so as to lie between the studs of the partitions, and are connected with the registers in floor or wall as previously described. A combination of

the hot-air system with that of hot water by direct radiation has recently been frequently employed with excellent effect in houses a little larger than those just mentioned. By a slight change in the construction of the furnace the surplus heat is utilised to obtain a supply of hot water, which is connected by a system of piping, with radiators placed in specially exposed rooms or those that would be difficult to reach with hot-air stacks. An instrument which is coming much into use in connection with the various heating systems is the "Johnson" thermostat. By its means the temperature of a room may be kept automatically at any uniform temperature, within a range of 15 or 20 degrees, according to the taste of the occupant. Its outward appearance in the room is that of a small quadrant with a movable pointer, which can be set to the "normal" point in the centre, or to the left or right to a greater or less degree, according as it is desired to have the temperature cooler or warmer. A small thermometer indicates the present temperature of the room. The concealed mechanism of the regulator within consists of a tiny bar composed of strips of steel and platinum fixed at one end, and bending inwards or outwards at the other according as the greater or less degree of heat acts on the irregular expansion of the two metals. This action either increases, diminishes, or altogether stops the flow of a stream of compressed air continuously supplied by an automatic valve connected with the water main, and the force thus dissipated or generated in turn operates to open or close a valve determining the supply to the radiator, or, in the case of a hot-air furnace, either the furnace damper or one on the shaft conveying the hot air to the room in question. Thus when the temperature falls below the desired point more heat is supplied, and *vice versa*.

PLUMBING AND DRAINAGE.

Probably in no department of practical architecture has greater progress been made in the United States of recent years than in those of plumber work and drainage generally. Not many years since America was behind England in these respects, now she is very much ahead in the race—I speak, of course, from knowledge of the Eastern cities only. This rapid progress is due mainly, if not entirely, to the stringent laws adopted by the various city "Boards of Health," and rigidly enforced. At the same time the universal cellar has something to do with the change, for by it alone is rendered possible the system of open piping. In New York, when warrant to build is sought from the city authorities, besides the usual plans submitted, a separate and complete set of plans and sections showing plumber work and drains, to the scale of a quarter of an inch to the foot, has to be deposited with the Board of Health. On these the nature and positions of every fitting, pipe, and trap are clearly shown. In addition to the published regulations, a draft specification is issued by the Board for the guidance of architects. In one respect only do the regulations of the New York Board seem behind those generally adopted in this country: separate soil and waste pipes, while authorised, are not required, and in consequence are rarely supplied. On the other hand, it is insisted that rain-water "leaders" must never be used as soil, waste, or ventilation pipes. The bearing of one or two clauses may be noted as indicative of the general style of the work required. The house drains inside the walls *must* be extra heavy cast-iron, and also outside to the connection with the sewer, except by special permission, and in suitable soil. House drains are *prohibited from being laid underground* within the walls, except by special permission. Drain, waste, soil, and ventilation pipes must be exposed to view where practicable. All traps must be protected from syphonage by ventilation pipes, and these, where the building is more than four storeys in height, must be at least 3 inches in diameter. A vigorous crusade is at present being directed against this last clause by some of the leading sanitary authorities, and a strong case is made out in favour of one or other of the anti-

syphon traps as more effective than the vent pipe, but so far the Board of Health remains firm. From the summary of the first-mentioned clauses, two main characteristics of the modern American plumbing and drainage systems may be gathered, namely, the openness of everything in this class of work, and the substitution—along with cast-iron for fire-clay drains—of wrought-iron and brass for lead in the supply and smaller waste pipes. Openness combined with exposure to the weather is, of course, not possible with such low temperatures in winter, where even the inside surface of an outer wall is found to be insufficiently sheltered from the frost. The vertical drains, therefore, waste, soil, and ventilation, are gathered together as far as possible within a pipe chamber or shaft, well inside the house, and so arranged as to be altogether open or readily accessible at all parts. The horizontal or "lying" drains are in like manner suspended in the open. The basement already provided for the heating apparatus renders this possible, and in it the pipes, with branches, traps, and fittings generally, all of cast-iron, are either suspended from the ceiling by iron straps, or supported along the wall by brackets of similar material. Where change of direction occurs, instead of a simple bend a branch is used, the unoccupied arm being closed with a screw stopper with a nut cast on the head, so that a powerful spanner is alone required to provide ready access for inspection [fig. 9]. Similar inspection openings are provided at both ends of the traps, and at all branch connections. The threads of these screws are made tapering, securing absolute tightness, and the joint is made up with red lead and oil. The ordinary spigot and faucet joints are of course staved with lead, and in order to provide against such scamped work as a mere crust of this material on a base of sawdust or oakum, the law requires that one pound of lead be used to every inch in diameter of the pipe to be jointed. For all pipes of smaller section than about three inches in what would in this country be recognised more particularly as plumber's work, the lead pipe with its wiped joints has almost universally given way to brass and wrought-iron. These are left perfectly open, and may generally be seen in a group running from floor to ceiling in one corner of the lavatory or bath-room, the brass pipes, as employed in all superior work, being nickel-plated, the iron either bronzed or painted. Lead piping is only employed for short connections where the distance and direction are uncertain until the work is being executed, and is connected to the main system by brass ferrules and wiped joints. As for the baths, lavatory basins, and water-closets, I was unable to detect much difference between those employed and these put on the market by our leading makers, but the difference in the system of connection is striking, and altogether in favour of the American method.

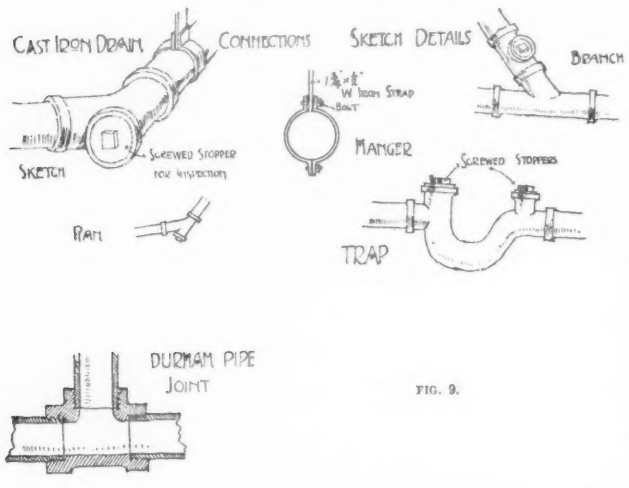

FIG. 9.

Sewage disposal.—A solution of the vexed question of sewage disposal for isolated houses and small communities, known in the States as the "Waring" system, was first brought under my notice at Baltimore. It is, as afterwards discovered, employed not only in that neighbour-

hood, but very generally throughout the Eastern States at least, and with entirely satisfactory results. This is a system of intermittent surface (or nearly surface) filtration, which the Mr. Waring whose name it bears lays no claim to have discovered. It is the same, with some modifications and amendments, as that first employed by Mr. Moule, and afterwards in an improved form by Mr. Rogers Field, in this country. But while it has made little progress here so far as I am aware, it is, as stated, now largely made use of in America, where possibly the drier climate and soil may have something to do with its successful development. Its main features are: a settling and a discharging tank, capable of holding the entire sewage discharge of the house or group of houses for a period of from twelve to twenty-four hours; a system for automatic discharge at such periods of the sewage gathered; and irrigation drains or channels arranged in two or more groups, for distributing the outflow in alternation over or immediately under the surface of the ground (fig. 10). A later improvement consists of the omission of the settling chamber, or rather its combination in one with the discharging tank in an elongated and open trough, protected from falling leaves, &c., by a wire-wove covering or lid, and with a receiver or cage fixed at the inlet. This cage is made of galvanised iron-wire cloth with 1-inch meshes, and is provided in duplicate, so that af er each discharge the one first used may have the more solid matter which it has retained, with the paper, &c., shaken out and dug into the ground, and then be thoroughly cleansed and aired while the other is in use. The syphon should be altogether outside the tank, to prevent i s fouling, but in practice it is frequently placed within the discharging chamber in the manner of that in an ordinary cistern. The connection between the house and the tanks, and that between these and the distributing drains, are made by jointed pipes in the ordinary manner, but with a very flat fall, in order to prevent too great disturbance in the first instance, and a too heavy local discharge in the other. The alternate distribution of the outfall is effected by gates—cement-formed sinkings or pots—with iron sluices, one of which may be opened while the others are closed. The distribution itself is effected by one of three methods: (*a*) 2-inch tile drains, open jointed, the upper half of the joints protected by loosely laid-on caps, and laid in a flat tile channel, also open jointed (these joints alternating with those of the pipe), and the whole distributed in parallel lines from 3 to 6 feet apart, 10 inches under the surface of the ground; (*b*) for heavy soil, 4-inch horseshoe or inverted tiles laid in trenches filled with stone or gravel, and with a thorough system of subsoil drainage underneath; (*c*) open filtration over the surface of the ground by irrigation channels. The fall in all cases is very slight, not more than 2 inches in 100 feet. The first is the system universally employed in the instances described about Baltimore. The particulars regarding one may be taken as representing all: a house of ten apartments and offices, occupied by a family of six to nine persons with servants; soil, a sandy loam; tanks constructed to hold 600 gallons, and discharging about once in twenty-four hours; area of ground used for filtration, and in the immediate neighbourhood of the house, 60 feet by 80 feet; total length of 2-inch piping required, distributed in three sections, about 1,000 feet. It may be

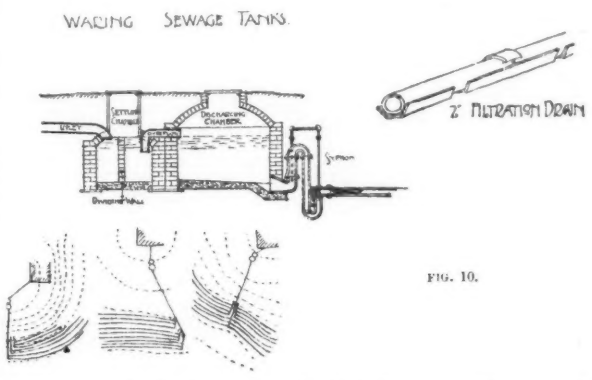

FIG. 10.

noted that, though the irrigation drains require to be nearly level, this does not necessarily involve a flat piece of ground, as they may be connected with the outfall from the tanks at right angles if necessary, and carried round parallel to the contours of a slope if such is the nature of the land to be treated. An example of a larger installation of the system was visited at Rowland Park, an outlying suburb of Baltimore, consisting of about 120 detached villas and cottages, with about 1,000 inhabitants. The natural slope of the ground, which has a considerable fall to one corner, is taken advantage of to carry the whole of the sewage to the filtration bed situated (within a hundred yards of the nearest houses) on the lowest level, and immediately adjacent to a brook into which the effluent passes. The distribution is entirely on the surface. The sewage, sent alternately in different directions by a "gate," such as already described, passes over a bed laid with bricks in cement, through wire screens, and thence by a series of very flat channels, formed on the surface of the ground, over the patch of meadow land, which is all that is required for the purpose. The whole area of this was not more than two acres, divided into five sections; it was covered, when visited, with fresh-growing grass, a pleasant contrast to the somewhat dried-up surroundings, and though a general discharge of sewage had taken place a few hours before, there was not a trace of unpleasant odour in the air.

What practical lessons may be drawn from the practice of our professional brethren on the further side of the Atlantic, how far their special methods may be found to apply to our work at home, are questions which, at the end of an already too extended paper, must be left to the judgment of those members of the Royal Institute who have followed it. I may not conclude without expressing my thanks to, and recording my respect for the memory of the deceased founder of this Bursary, of gratefully acknowledging the honour which the Council of the R.I.B.A. bestowed on me in making me its recipient for the year 1896; and finally, while expressing my regret that limits of space have prevented my making use of but a small portion of the material placed at my disposal, of recording my very cordial appreciation of the unstinted assistance and unnumbered personal kindnesses received from the architects of the United States of America whom I had the pleasure of meeting during my tour.

DISCUSSION OF MR. PATERSON'S PAPER.

Mr. H. L. Florence, *Vice-President*, in the Chair.

Professor KERR [*F.*] said Mr. Paterson's Paper contained a great mass of detail with reference to the internal contrivances of American houses, which it was impossible to discuss at so late an hour. He hinted that it might be advisable to give members of the profession, expressly interested in such matters, an opportunity of indulging in an exhaustive discussion of them on another evening, as had been done before on many occasions; but, as he had been asked to speak, he would make a few remarks upon the subject of plan, with which he was somewhat identified. He had visited America—unfortunately fifty years ago; but he had always kept up his connection with that country, and was pretty well informed as to the details and facts given by the lecturer. There were several national characteristics and peculiarities which affected the plan of American houses. The country possessed a great many more climates than one; and that would remind those who had studied Richardson's designs, which were very peculiar, of the suggestion that, without originating novelty, Richardson mainly adopted the characteristics of the South and applied them to the Eastern States. So it was with reference to a good many of the plans given in the Paper. With regard to the difference of class relations referred to by the lecturer, it was, of course, well understood that the relation between master and servant, as it existed in Europe, did not exist in America at all. The servant, in his own opinion, was quite as good as his master, and occasionally would tell him that he was a good deal better; there was thus an important difference of social discipline which must not be left out of account. Therefore, when the lecturer spoke of his (the Professor's) dictum, that there ought to be a separation between the two families living in the house in England, namely, the family properly so called, and what he might call the family of servants in a good house, it was not his dictum at

all, but was the universal doctrine of gentlemen's houses, and was carried out by the late Mr. Burn, who was historically their Prime Minister of planning, to the utmost extent. Another peculiar characteristic about the Americans not easily explained was their fondness for hotel life. It was not that they preferred to live at an hotel, or that they went out of the way to live at an hotel, but the manner in which they occupied their houses, as the plans exhibited showed, was very much like hotel life. Take the plans of the two houses in Madison Avenue [p. 313]. The large house was evidently intended for a gentleman of very considerable wealth, and determined to exercise his right to have a very considerable display. It was a corner house, and the whole length of the house fronting upon the return street was occupied by the dining room at one end; the reception room next; what was called the *foyer* (*i.e.* an open stair landing) next; then another reception room, and the drawing-room in front; a magnificent staircase being at the rear in the middle. The whole of that series of rooms were constituted a single suite by means of very wide folding doors. That arrangement would not do in England. The only similar case that had occurred in his own experience, without mentioning names, was that of a gentleman who would be known as the editor of the century. "I want," he said, "my house designed in a very peculiar way. It must be perfectly comfortable for a small family according to English notions, and at the same time it must be capable of being thrown all open upon occasion into one suite for receptions. People are good enough to invite me out a great deal, and that is the only way I can return the compliment." But the gentleman in Madison Avenue had sacrificed the comfort of his house entirely, and he had not done it after the French manner, but after the American manner, which they in London could not expect to derive any suggestion from. In the house in Madison Avenue there was furthermore the same suite on the ground floor, a magnificent staircase, a large hall looking out on to the street, a library, a billiard-room, with a little ante-room as a card-room, the whole forming a second grand suite. So that so far he had two reception suites in the house and little else besides, except a bowling alley below connected with the billiard-room. With regard to the small house alongside it, that the lecturer had spoken of with great approval, he (the speaker) called it an exceedingly badly planned house—most uncomfortable according to English notions. The sliding door was another peculiar characteristic of the American house which would not answer in England, and which was again suggestive of hotel life. The American liked to live in his own house as if he were in an hotel. Without going into historical matters, it would be seen clearly that this was of the Latin style of living, introduced by the Americans from the south of their own territory. The Latins founded their house plan upon the open court without a roof. The Goths, on the other hand, founded their plan always upon the confined and enclosed hall, the house-place, as they called it. The Americans, for climatic reasons, accepted the Gothic principle only to a certain extent, and so it was that this peculiarity of plan arose. Another peculiarity, the bedroom closet, would not do in England in any decent house at all; it would get stuffy and altogether nasty from the things stowed away there. And this was a *sine quâ non* of an American house! Then the fold-up bedstead!!—

> "Contrived a double debt to pay—
> A bed by night, a chest of drawers by day!"

Could anyone seriously contend that that would be a desirable thing in London? It was the hotel life again. The occupant of the bedroom had no privacy in any of the other rooms, such as they had in English houses. The American, if he wanted privacy, had to go to his bedroom, shut the door, fold up the bed, and enjoy himself as in a snuggery. There was one room, in a plan shown, marked with the word "den." If by "den" was meant an informal retreat for the gentleman when he did not want to be disturbed at all, then it was altogether too small and insignificant. One plan well worth studying was fig. 6, p. 318, Shamrock Cliff, Newport, by Mr. Peabody (whom some of them knew very well a good many years ago) and his partner. Judging by other plans the question of aspect seemed to be considered too little. However, this was a very curious house with two slanting wings, well worth looking at. One curious feature in it was that at each end of the garden front there was what was called a porch; it was really an open shed of an ornamental character, in which the inmates could accommodate themselves in the sunshine or in the pleasant evening, upon the verandah principle, which the lecturer so well described, and from which something might be learned for English country houses. As regards peculiar houses, most gentlemen who had made a study of plan would agree with him that a worse plan could scarcely have been devised than that figured on p. 314, Davidson House, Washington. Great allowances must be made for the ridiculously absurd shape of the ground; but he could not agree with the lecturer in thinking that the awkwardness of the site was turned to advantage. He should say that the awkwardness of the site was emphasised by the detail of arrangement; the plan, however, was not easy to understand, and one could not tell exactly what the arrangement was. With regard to the hall, Americans thought that not sufficient was made of it in England. There were houses, however, in this country where the hall was all that it should be, and more particularly had it been developed lately, in towns, very creditably, as by Mr. Norman Shaw and others. The hall was a rendezvous, and when large enough to be a lounge, it added immensely to the comfort and convenience of the house. But the Americans

made the hall and the house a sort of string of compartments joined by folding doors—and they kept the doors open—which of course was perfectly at variance with all English notions of comfort and convenience. With regard to the servants, where these were very few and very independent, there might be some considerable difference of arrangement necessary, as compared with the English system; but this, he maintained, made it all the more necessary for separating the two divisions of the family. He always said, and he believed it was Mr. Burn's principle, that the servants were entitled to their own privacy just as much as the family were. He would conclude by proposing a vote of thanks to Mr. Paterson for his Paper, which was most interesting, most instructive, and representative of a very great deal of painstaking on his part.

MR. H. HEATHCOTE STATHAM [*F.*] seconded the vote of thanks very heartily. When printed with some of the diagrams the Paper would prove most useful to them and worthy of careful study. With regard to the typical plan of the American house, a great deal of what Professor Kerr had said as to its unsuitability to the English climate was perfectly true, and he entirely agreed with it; but he could not help thinking that a study of the American plans might help English architects to get a little out of the ordinary groove of house planning, whose usual drift was a number of shut-up rooms. It was a question whether, if they had more of a scientific system of heating houses, a greater appearance of spaciousness and dignity might not be given to them. Something like the American house idea had been actually carried out not further off than the borders of Wimbledon Common by a great sea-painter. The owner had shown him one day how he had planned it on the plan of a cathedral, observing, "It is a comparatively small house, but I like to have spaciousness." Consequently he had planned it as a Latin cross, of which the hall was the nave, the drawing-room took the place of the chancel; there was a transept on one side, which, he believed, the owner made his study, and a transept on the other side that served as the dining-room. The whole of the house was heated by hot-water pipes carried all round the rooms, and each bay could be shut off by thick curtains whenever desired. He did not know whether he should care to live in that house himself, but it was at any rate an interesting variety, and it had the advantage of giving an appearance of spaciousness to a comparatively small house. In the summer, when one did not require to separate the rooms, they could all be kept open, so that the occupants could roam about them, instead of being always shut up in one room with a door. That was a suggestion worth considering, and he believed it was arrived at by the owner quite independently of any study of American plans. In addition to the system of having the house more open, there was also much suggestiveness and originality in American plans in regard to the shape of the rooms. They did not confine themselves to rectangular rooms as we do in England; but they introduced oval and circular rooms, which, though in some points inconvenient, still have the advantage of variety, and give opportunity for very pretty architectural effect internally.—Mr. Statham, in concluding his remarks, referred to the word "stoop" used by the lecturer; he had seen the expression in an article on house planning in *Scribner* or *The Century*, and was under the impression that it referred not to the stairs, but to the large arch under the stairs, from which it seemed to have a more natural derivation.—Professor Kerr explained that "stoop" was a Dutch term, and meant the steps at the entrance.

MR. A. N. PATERSON, in reply, said that with regard to one or two matters mentioned by Professor Kerr, he did not wish to be taken as an apologist for the American type of house plan. The plans were not brought forward with the idea of putting before English architects something that was superior to what they were accustomed to in England; by no means. He had made the matter a subject of study, as it was his duty to do as Godwin Bursar, and he had brought before them the results of his study, leaving them to each architect to take or leave as he felt inclined. At the same time, the matter of openness, as he had tried to show, was essentially largely derived from their system of heating; the house being equably warmed, there was no further necessity for doors, except for privacy. The American liked a certain amount of publicity, as Professor Kerr had said; and in so far his idea of openness and spaciousness would be disagreeable to English people. At the same time, as Mr. Statham had said, there was some advantage in treating a small house in that way. He did not think it possible, without some application of a general system of heating, because it would make the house windy and draughty to a disagreeable extent; but, with a good plan of heating, something could be done in making a small house more picturesque and spacious. Having lived in houses planned as he had described, he could say that it certainly had a curious, but at the same time a pleasant, effect to sit in the dining-room, and, with the doors thrown open, be able to look right through into the drawing-room and possibly into the conservatory beyond. With regard to the "den" in the house at Brookline, Boston [p. 317], referred to by Professor Kerr, the "den" simply meant a study. The house, which was a banker's, had large rooms all *en suite*, as was the habit; but in one corner the owner had his little private room or study to which he retired, and which had the ordinary closed door for privacy.

With regard to the bedroom closet, his own impression, after seeing it in America, was that, if properly attended to, as he had seen it in the best houses, with, in many cases, a window, and with the linen, portmanteaus, and other things kept in their proper places, it was a distinctly desirable addition to the house, and one that might be well introduced in English houses. The folding-bed was, of course, an anomaly, as any American would properly regard it; it was only to be found in the smaller and poorer class of house. He should like to explain that, in using the term "Professor Kerr's dictum," his meaning was that Professor Kerr had put into gospel what they knew to be the exact state of affairs; by laying it down in his standard book on house planning, it had become a word in English house planning, and recognised as such. And, curiously enough, Professor Kerr had referred with respect to the architect whose book on this matter used that expression—namely, Mr. Peabody, of Boston. He was sorry Professor Kerr had fallen foul of the Washington example. He thought that, with a little more study, it would be found to have its good points.

9, Conduit Street, London, W., 23*rd April* 1898.

CHRONICLE.

Mr. Paterson's Paper.

The illustrations to Mr. Paterson's Paper comprised a numerous collection of plans and working drawings representative of the various types of buildings treated, and presented to the author by architect friends in the United States for the purposes of the Paper. They included plans by Messrs. Peabody & Stearns, Mr. Alex. Mackintosh, Messrs. Adams & Warren, Mr. H. J. Hardenbergh, Messrs. Kimball & Thompson, Messrs. Hartwell, Richardson & Driver, Messrs. Trowbridge, Colt & Livingstone, Messrs. Hawk & Wetherbee, Messrs. Rossiter & Wright, Messrs. Wyatt & Nölting, &c. Also a series of diagrams illustrating the sections on Heating and Drainage, together with reproductions to smaller scale of several of the plans prepared for the Report submitted by Mr. Paterson to the Council last year in compliance with the conditions of the Godwin Bursary.

In some preliminary remarks before reading his Paper Mr. Paterson explained that, in order to keep the Paper within reasonable limits for Journal purposes, the original Report had been considerably cut down, and the illustrations to be given in the Journal were fewer than he could have wished. But the Report itself, very fully illustrated, could be consulted in the Library, along with a number of pamphlets, by American architects, bearing more or less upon the subject dealt with.

Among pamphlets laid on the table, and since presented to the Library by Mr. Paterson, were "The Purification of Sewage by Forced Aëration," and "Sewage Disposal at Wayne, Pa.," with plans and sections, by George E. Waring, jun., M.Inst. C.E.; and "The New York Tenement-House Evil and its Cure," by Ernest Flagg, architect.

Exhibition of Industrial Art at Bordighera.

Mr. John Hebb [*F.*] writes that an exhibition of Industrial Art has been recently opened at Bordighera, mainly by the exertions of Mr. Chas. Bicknell, a resident English artist. It appears from the local paper, *L'Arpa Grafica*, that the English contingent is well represented, many of the exhibitors being ladies, including Frau von Tigerström, Mrs. Riccard, Mrs. Stephenson, Miss Gladstone, Mrs. MacConnel, and others. Speaking of an exhibit by the Brothers Semeria, the reviewer praises "a cabinet in male oak from a design published about thirty years ago by the English architect, Signor C. L. Eastlake. The style is Gothic as it was understood at that period, and although no longer fashionable at the present time, it has the distinction which is always found in the work of this accomplished artist."

REVIEWS. LXXI.

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ARCHÆOLOGICAL SURVEY OF INDIA.

Lists of Antiquarian Remains in the Central Provinces and Berár. Compiled by Henry Cousens, M.R.A.S., Superintendent Archæological Survey, Bombay. 1897.

This publication, issued by the Indian Government, is little more than a compiled list, as the title implies, of archæological remains in the localities named. A list, previously published, of remains in Bengal, was noticed in this Journal about two years ago,* and was there termed an "Archæological Domesday Book." The same expressive title might be given to the present work, as it is a similar contribution towards the

* Journal R.I.B.A., Vol. III. 3rd series, 1896, p. 537.

enumeration of ancient remains still existing in India. When the railway engineer, the pipal tree, and other destructive powers have accomplished their work—and even long before that time arrives—such compilations will become invaluable to the historian, as well as to the archæologist. These lists do not seem to be so methodically arranged as the Bengal lists; still they convey a great amount of information about the temples, tanks, palaces, and old structures of every kind in Central India. In many cases there are descriptions, more or less detailed, of the remains. It may be mentioned that further information will be found regarding many of the places mentioned in Cunningham's *Archæological Reports*, in vols. vii., ix., xiii., and xvii.

The astonishing thing indicated in this work is the immense quantity of archæological remains still existing in Central India. There are not only Hindu temples—some of great antiquity—palaces, forts, &c., but there are also stone circles, standing stones, "prehistoric stone sarcophagi," and cromlechs. At Takalghat, ten miles south-west of Nagpur, there are mounds and "rough stone circles" covering five and a half acres. Walls formed of large stones without mortar are reported as frequent.

From these lists we can realise how the Muhammadan conquerors must have destroyed temples and other structures in the Gangetic valley. In a late notice of the work by Dr. Burgess, on the *Muhammadan Architecture of Ahmadabad*, it was shown how the Musalmans had either converted the Jaina and Hindu temples into Musjids, or carried off the material to serve their own purposes. A portion, at least, of the Central Provinces appears to have remained, like an island in the tide of conquest in India, and thus escaped the iconoclastic flow of destructiveness. If the Muhammadans came to that region, their stay was either too short or their numbers were not sufficient to enable them to ride rough-shod over the mass of the people. There is still more to be said in relation to this mode of accounting for the remains. Even the Aryans, in their early conquest of India, do not seem to have quite absorbed this part of the country. That is shown by the existence of primitive tribes in it. Conspicuous amongst these are the Gonds, who have even yet a Raja of their own—or they had one in 1861, for I saw him at a durbar held that year by Lord Canning in Jabalpur. Mr. Cousens mentions one detail that becomes a further evidence. At Dantivádá, in the Bilâspur district, Meria sacrifices were practised. These were human sacrifices, and were continued in Orissa, and in at least this one spot in the Central States, till the present century, when the Government managed to have them suppressed. A custom of this kind must have come down from a primitive period, and it shows how isolated Orissa and the Central States must have been to escape the more advanced influences of civilisation. All this combines to tell the same tale, and to explain how there are so many architectural remains in this central spot.

It is hard to say how many of the difficult problems connected with origin in Indian architecture might be solved if anyone with the necessary knowledge would devote a cold season or two in exploring this part of India. It is to be hoped that this may be done.

In a list like this, compiled from various sources, perfect accuracy is not to be expected, and criticism is scarcely called for. To call attention to an overlook is perhaps the best form of comment. In the notice given of Rânipur Jhâria, with its group of numerous temples, mention is made of an enclosure with a temple of Bhairava, where there are sixty-one human figures. No one reading this would be aware that this temple belongs to a class which is so very rare in India that there are only two or three known now to be in existence. It is a circular hypæthral temple, with sixty-four cells in the circle, in each of which there is a figure of one of the sixty-four female demons or goblins, known as the "Chaonsat Yogini." The best known example of this form of temple is one at Bhera Ghat, near Jabalpur. There is another at Khajurâha, in Central India; it is rectangular, but has the sixty-four cells. In vol. xiii. of Cunningham's *Reports* an account of the one at Rânipur Jhâria, with a plan by Mr. Beglar, will be found. Mr. Beglar, it may be mentioned, calls the place "Ranipur Jural."

Before closing this notice attention may be called to a rather big chronological error. At p. 59, a temple at Biramdeva is referred to "as one of the most ancient in the district; it is said to date from A.D. 103 (?)." A Saivic temple of that date would certainly be interesting. It will be seen that Mr. Cousens adds a note of interrogation to his statement, as if he were doubtful. The answer to that note of interrogation already exists. Cunningham visited the place in 1881–82—he calls it "Boram-deo"—where he saw the inscription, and its correct reading is A.D. 1551.* But, according to Cunningham, the temple is older than the inscription. He says, "It is a very fine old building, and I am glad I was induced to visit it."

WM. SIMPSON.

(192)

COMPENSATION.

The Law and Practice of Compensation, with the text of chief Statutes relating thereto, and Forms and Precedents. By H. C. Richards, F.S.A., M.P., and John P. H. Soper, B.A., LL.B., Barristers-at-Law. 8o. *Lond.* 1898. [*Frank P. Wilson, "Estates Gazette," 6 St. Bride Street, E.C.; Sweet & Maxwell, 3 Chancery Lane, W.C.*]

The authors of this work inform us in the preface that it is "offered for the assistance of not only the legal profession, but of surveyors,

* *Archæological Reports*, vol. xvii. p. 34.

accountants, and other experts engaged in compensation work." I venture to think that "surveyors, accountants, and other experts engaged in compensation work" are more likely to avail themselves of the assistance it offers than are the "legal profession." The legal profession are already supplied with many most excellent and exhaustive works on the subject of compensation. It is only necessary to mention such treatises as those by Mr. Cripps and Messrs. Balfour Browne and Allen to make it clear that lawyers who practise in this particular line of business are in no want of any assistance that literary or legal ability can supply. Though the authors of this little work promise them that there is something in it which is not in the standard works, it would be safe to prophesy that compensation lawyers will think that if this something is true it will hardly be new, and if it is new it is hardly likely to be true.

At the same time, in its own sphere the work should prove a useful contribution to legal literature. Surveyors and valuers who want a clear and simple statement of the main points of the law of compensation will find that here, better, perhaps, than anywhere else. And the statement of the law, as far as I have been able to test it, is not merely clear and simple, but correct. The surveyor, valuer, or even arbitrator, who masters the 265 pages devoted to the exposition of the law of compensation, will find that he has enough legal knowledge on that subject to enable him to do his work intelligently and well.

The book consists of 618 pages. Of these, as has been said, 265 are taken up by the exposition of the law of compensation. The remainder are devoted to giving the text of some statutes bearing on the subject matter, and to reports of some cases on compensation taken from the *Estates Gazette*, and an elaborate index to all such cases which have appeared in that journal, at the office of which the work is published. Among the statutes given is, of course, the Lands Clauses Consolidation Act 1845; but why the three Acts amending that statute, and to be read with it, are omitted it is difficult to say, especially as some of the alterations made by the amending Acts are not referred to in the text of the principal Act as here given. Thus, section 10 of the principal Act is printed as originally enacted, though it has been partly repealed by section 1 and greatly extended by section 2 of the Lands Clauses Consolidation Act 1860. As to the cases reported, and the index (which between them run to nearly as much matter as the whole of the authors' exposition of the law), the best that can be said for them is that they may be of some service to surveyors or valuers in preparing their cases for trial; to the lawyer they are absolutely useless.

J. Andrew Strahan [*H.A.*].
Barrister-at-Law.

NOTES, QUERIES, AND REPLIES.

Artistic Copyright—Patents for Plans.

From Messrs. Flockton, Gibbs & Flockton (Sheffield)—

In the discussion of the Paper by M. Harmand on "Artistic Copyright," questions were asked the lecturer as to "whether he was aware that one firm of architects in the country did go so far as to patent one of their designs, and whether he had made any inquiries as to their care in taking out that patent, as to whether it was satisfactory to them, or whether it had any effect in any way upon other architects."

We believe we are the only firm in the country who have patented a design, and that probably therefore the questions refer to us; and the Institute having so lately discussed the subject, it may interest readers to hear our replies, viz.: We protected our design as a "plan," not as an "artistic design," and that it has not yet been directly infringed is due either to the care with which the patent was prepared, or to the worthlessness of the subject of it; that the latter is not the case we infer from the fact that nearly the whole of the municipal buildings since designed have partially adopted the separation of departments, that the separation of departments has been wholly adopted in a polytechnic institution, and the building in wings with a central hall and staircase has been adopted in a public hospital. In further reply, the patent has not been satisfactory to us, inasmuch as it has not benefited us, and has, we believe, deterred other architects from adopting the plan in its entirety.

Remembering that at the time of taking out the patent we were recommended by the Council of the Institute not to do so, but to follow the honourable tradition of the medical profession, we are pleased to find that the kindred subject of "Artistic Copyright" has been thought of sufficient importance to be the subject of a Paper read before the Institute.

Winchester Cathedral.

From Mr. Francis Bond—

The reviewer of Mr. Sergeant's book on Winchester Cathedral credits Bishop Edingdon, or Edington, of Winchester, with originating the Perpendicular style. Is not the credit due rather to the masons of Gloucester and Tewkesbury? The south transept of Gloucester, parts of which are fully developed Perpendicular, was completed before 1337. The choir, which is completely Perpendicular, seems to have been vaulted and glazed before 1351. Bishop Edington laid the foundation of Edington Church in Wiltshire in 1352, in which there is still a strong admixture of Curvilinear forms. The western bays and west front of Winchester Cathedral, which are much

more advanced in type, would appear to be later still; indeed, not much before Edington's death, in 1366.

The date assigned to the rebuilding of Winchester Tower also seems improbable (1200). The design of the internal tower-arcade is of the very greatest beauty, but can hardly be later than the middle of the twelfth century.

The late William Burges, A.R.A.

From JOHN HEBB [*F.*]—

An interviewer, who had buttonholed Mr. Val C. Prinsep, R.A., at Eastbourne, and who has related the result in the pages of the *Strand Magazine*, confounds Mr. J. B. Burgess, R.A., with Mr. William Burges, A.R.A., the architect, two persons who had nothing in common, with the exception of the similarity of their names. Recalling his life at Oxford, the interviewer makes Mr. Prinsep say: "Rossetti himself, though, had a way of making quaint little rhymes at the expense of his friends. He criticised as puerile the decorations by Mr. Burgess, R.A., and would burst forth as follows:—

> There is a poor fellow named Burgess,
> Who from childhood never emerges;
> Unless you were told he's disgracefully old,
> You might offer bulls'-eyes to Burgess."

The lines, which are incorrectly given, were written of William Burges, A.R.A., whose juvenile manner was a constant source of pleasantry among his friends. The lines should run:—

> There was a young fellow named Burges,
> Who from babyhood barely emerges;
> If you had not been told
> He's disgracefully old,
> You'd perhaps offer bulls'-eyes to Burges.

This is a very different matter from the interviewer's version, which halts pitifully, and is quite unworthy of Rossetti, whose lightest productions were finished with the greatest care and precision.

Cement Pipes.

A novel form of pipe for water or drainage purposes, recently invented by a Frenchman, is noteworthy. A trench is dug in the ground where the pipe is required to be laid, and is partly filled in with good cement. Upon this soft substratum is laid a rubber tube covered with canvas, and tightly inflated with air. The trench is now filled up with cement, so that the tube is completely covered with an inch or more of the plastic material. As soon as the cement sets, the air is let out of the tube, and it is easily extracted from the pipe, of which it for a time formed the core. The tube can then be again inflated to serve for a fresh section of the pipe, which can be as much as six inches in diameter if required. It is said that a cement pipe of this thickness has been successfully laid by the new method at a cost of about one shilling per yard.

THE HISTORIC DEVELOPMENT OF ARCHITECTURE.

Abstracts of Lectures delivered this year at the Glasgow School of Art.

By W. J. ANDERSON [*A.*].

III.* (LECTURES XIII.—XV.)

IN introducing the subject of his next lecture, Mr. Anderson stated that the period which is marked by the Early Pointed style is one of the most formative in the history of the French and English people, closely united at the time politically. Circumstances which should be kept in view are—the preaching of the Crusades and the pilgrimages to the Holy Land; the contact with Arabian culture; the establishment of freemasonry or a secular school of architects, especially in France; the development of English boroughs and of towns round abbeys and castles; the blending of the English and Norman settlers; the defeat of the English, Saxons, and Flemings in France, and the consolidation of that country, bringing about the cathedral building epoch. Gothic construction was defined as beginning in the construction of an independent frame of arches, a skeleton construction governing the form and plane of the vaulted surfaces, which are stretched between them like webs. This structural principle is revealed first in France, in which country also are its greatest achievements. But it is a different thing to admit that France was first in the field, and to contend, as do some recent writers, that there is no English Gothic architecture. In French architecture each vertical moulding or shaft has its apparent work to do in the way of supporting an arch order or vaulting rib; and on these grounds its constructive supremacy is founded, it being overlooked that these shafts do not do the work at all, but are, at the most, so much functional decoration. In this, as in other matters, the French no doubt prove themselves more logical, but frequently carry logic to a *reductio ad absurdum*, as at Beauvais and Bourges. The Gothic construction, whether consistently carried out or not, was opposed to sound statical principle, and in its practice has covered the land with ruins, to which the system of covering the stone vaults with perishable roofs has largely contributed; those which remain being preserved, at enormous cost, only by frequent restoration, and the exercise of considerable engineering skill. The changes made during the Early English period (1189–1272) upon the Anglo-Norman cathedral plan were noticed—the development of the choir, the substitution of a rectangular presbytery for the Norman apse, the appearance of the eastern transepts and the screen façade, suggesting a huge iconostasis. The development of pier arcades, windows, doorways, mouldings, and ornament was sketched. The Scottish examples of the style (1210–1350) were considered, and the conclusion

* For sections I. and II. see pages 138 and 300.

arrived at that, down to the beginning of the fourteenth century, they closely followed the English development. As the Norman wave spent itself in Scotland, it happens that the Scottish buildings are largely of the transitional type, retaining the square abacus and arch order; and this partly accounts for the French appearance which has misled many observers, but which they do not derive from France directly. In conclusion, by a double lantern arrangement, the French and English cathedrals were contrasted in their plans, exteriors and interiors, *e.g.*, the exterior of Salisbury with Beauvais, the interiors of Exeter with Amiens, Lincoln with Chartres, and the square east end of Lincoln with the chevet of Le Mans. The object was to show the beauty or artistic significance of both, as well as the futility of the theory which, in a recent translation from the French, highly recommended for American use, traces each of the cathedrals of England to a French model.

The fourteenth lecture was entitled "The Middle English Style." It was said that perhaps it was more than a coincidence that the stages into which philologists had agreed to mark off the English language should correspond so closely with the three periods of Gothic architecture. This had suggested the terminology of this and the succeeding lecture; for the "middle English" of Chaucer and Wycliffe had a certain relation to the Decorated period (1272–1377), and the period might with more reason be looked upon as a transition to the "completed English" perpendicular style than as the culminating period of English art. The typical abbey church, with its conventual buildings, was described by the aid of the ancient St. Gall plan, and a plan of the abbey grounds at St. Andrews. Just as it was possible to divide the Gothic style into three periods, so might the middle English style be divided into three phases—geometric, flowing, and flamboyant, corresponding with the reigns of the three Edwards, from whom it derived the name of Edwardian. The west front of Lichfield, the crosses of Queen Eleanor, the choir and transepts of Exeter, the Lady Chapel of Ely, the nave of Exeter, Selby Abbey, the east end of Carlisle Cathedral, were in this order illustrated, as exhibiting the development of the work of the period; and, by details and diagrams, the changes effected in windows and doorways, arcades and vaults, roofs and towers, mouldings and ornament. The Decorated style was described as greater by what it designed than by what it accomplished. Because of the "Black Death" and the wars with France it was doubly unfortunate. In Scotland the wars of succession and the subsequent alienation from English connections prevented much being accomplished; but the nave, the transept, and part of the cloisters at Melrose, and the nave of Glasgow Cathedral, were instanced as examples of the period (1350–1450).

The following lecture, delivered on the 28th February, was entitled "The Completed English Style." The view was taken that the work of the Perpendicular period (1377–1547) was the distinctively English interpretation of the Gothic style; and that instead of being the decadence, it contained within it the culminating works of the English style. In its best examples, the royal chapels, the spirit of the French Gothic was embodied to better purpose than in the earlier phases. In St. George's, Windsor, and King's College, Cambridge, the Gothic ideal was for the first time expressed in distinctively English terms, and up to this consummation all previous steps had been leading. Progress had been consistently in the direction of richer surface decoration—in tracery, spread over vault and buttress and wall; while, on the other hand, simplicity and ease of construction were desired, and may have suggested the use of intermediate ribs in vaults as much as decorative feeling. Constructive simplicity is certainly sought in the perpendicular tracery of the windows and the rounding of the vaulting conoids, though these, once adopted, brought new difficulties in their train. Three backward steps or returns are made—(1) to the principle of reliance on vault surfaces of a regular geometric form; (2) to the square plan of a vaulted bay, and the old difficulty of the vaulting oblong compartments, solved differently at Oxford Cathedral and Divinity Schools, King's College, and St. George's; (3) to the "archaistic" use of Saxon, Norman, and Early English features, as at the parclose in Hexham south transept, the south wall arcade in the cloisters of Melrose, and other examples. Among the buildings of the period, illustrated by numerous photographic slides, were the nave and west front of Winchester; St. George's Chapel, Windsor; King's College, Cambridge; and Henry VII. Chapel, Westminster. In Scotland there is no Perpendicular style, no fan vaulting, and but little perpendicular tracery; but in place of it a revival of the Decorated style (1450–1560) mingled with features derived from France as well as England. Many of the buildings are collegiate chapels, or private foundations, planned frequently in one aisle, having a central or western tower, sometimes surmounted by a crown. A semi-octagonal apse terminates the church to the east, and in two cases the transepts take a similar form, while flamboyant tracery appears also to indicate French influence. Generally the work is heavier and simpler than in England, and the ceilings are frequently barrel-vaults slightly pointed. The examples of Rosslyn (the resemblance of which to Portuguese work was regarded as accidental), the south transept and east end of Melrose and King's College, Aberdeen, were among examples of this period, fully illustrated. In concluding, the lecturer exhibited comparative views of the naves of Canterbury and St. Paul's, London, remarking that it would be the business of the next seven lectures to show how the change of style was being worked out in Italy and France.

MINUTES. XII.

At a Special General Meeting held on Monday, 18th April 1898, at 8 p.m., Mr. H. L. Florence, *Vice-President*, in the Chair, with 29 Fellows (including 13 members of the Council), 20 Associates, and 1 Hon. Associate, the Minutes of the Special General Meeting of the 4th April [p. 302] being before the Meeting for signature by the Chairman, Mr. Wm. Woodward [*A.*] having inquired why, during the past few months, the number of members of the Council and of Fellows and Associates present at meetings had been omitted from the printed Minutes, and the Chairman having replied that the omission was due to an interior question connected with the management of the JOURNAL, Mr. Woodward suggested that for the future the numbers should always be inserted, as the information was useful to members not in the habit of attending the Meetings. The Minutes of the Special Meeting above referred to were then taken as read and signed as correct.

Mr. Woodward having further asked whether the Chairman was yet in a position to give the Institute any information with respect to the architect to be appointed for the designs of the new Government offices, and expressed the hope that whatever influence the President and Council might have with regard to the appointment would be exerted in favour of a member of the Institute, the Chairman replied that no information could be given at present, as the matter was entirely confidential between the Government and the Council of the Institute; members, he thought, might rest assured that the President would do what was right in the matter.

The decease was announced of Mr. Alfred Morrison, Hon. Associate since 1877.

The following Associate attending for the first time since his election was formally admitted and signed the register—namely, Mr. Herbert Shepherd.

With reference to the nomination of the President for the ensuing year of office, on the motion of the Chairman, seconded by Mr. J. M. Brydon [*F.*], it was

> RESOLVED, *nem. con.*, that the resolution of the Royal Institute, suspending By-law 26 for one year [p. 302 *ante*], passed at the Special General Meeting of the 4th April 1898, be confirmed.

The Chairman having announced that the Lords of the Privy Council had raised certain objections to ambiguities of wording in the additions and amendments to By-laws 9 and 30, as resolved upon at the Special General Meetings held respectively on the 14th June and the 29th November 1897, moved that the paragraph to be added to By-law 9, in accordance with such resolutions, should read as follows, the words in italics having been freshly inserted to carry out the intention of the Meeting and to meet the objections of the Privy Council:

> Provided always that when the Council of the Institute receive a unanimous recommendation formally submitted by the Council of any Allied Society that a practising member of the profession is eligible and worthy of being elected as a Fellow, the Council shall, *during the five years from the date of approval of this provision by the Privy Council*, have power to elect him, his work being of sufficient merit. The Council may also elect annually to the Fellowship without ballot the President or President-elect of any or all of the Allied Societies who may be eligible and apply for admission.

Professor Kerr [*F.*] having pointed out in reference to the last sentence that one person could not be "President" of "*all* of the Allied Societies," it was agreed, on the suggestion of the Hon. Secretary, that in the final sentence of the clause the words "or all" should be omitted.

A further correction, proposed by Mr. Edwin T. Hall [*F.*] and seconded by Mr. Ernest George, *Vice-President*, was agreed to, viz.: that after the words "have power to elect him," the concluding words of the first sentence should read "*if in their opinion* his work be of sufficient merit."

Mr. John Hebb [*F.*], having contended that the words "the Council *shall* . . . have power to elect" in the first sentence were mandatory, and the words "The Council *may* also elect" in the second sentence permissive only, and that no such distinction was intended by the original resolution, moved that the second sentence should be amended so that the opening words should read "The Council shall also have the power to elect." The proposition was seconded by Mr. Wm. Woodward [*A.*]

Mr. J. M. Brydon [*F.*], seconded by Mr. H. Heathcote Statham [*F.*], having moved as an amendment to Mr. Hebb's proposition that the words in the second sentence remain, and that in the first sentence the word "may" be substituted for "shall," and the words "have power to" be omitted, Mr. Beresford Pite [*F.*] objected to the amendment as placing a new power in the hands of the Council. Ultimately Mr. Brydon's amendment was withdrawn, and Mr. Hebb's proposition put from the chair and carried, whereupon it was

> RESOLVED, that the clause to be added to By-law 9, as finally amended and agreed to, should read as follows:
>
> *Provided always that when the Council of the Institute receive a unanimous recommendation formally submitted by the Council of any Allied Society that a practising member of the profession is eligible and worthy of being elected as a Fellow, the Council shall, during the five years from the date of approval of this provision by the Privy Council, have power to elect him, if in their opinion his work be of sufficient merit. The Council shall also have the power to elect annually to the Fellowship without ballot the President or President-elect of any of the Allied Societies who may be eligible and apply for admission.*

The Chairman explained that the alterations proposed in By-laws 30 and 31 were necessary to make the clauses agree with the change resolved upon at the Meeting of the 29th November last, by which the Council would remain in office until the last Meeting of the Session. It was thereupon

> RESOLVED, that the words "the said meeting" in the antepenultimate clause of By-law 30 be altered to "the close of the last General Meeting in June." And, further, that in the last sentence of By-law 31 the word "first" should be altered to "last."

The Special General Meeting then terminated.

At the Twelfth General Meeting (Ordinary) of the Session, held at the conclusion of the Meeting above minuted, Mr. H. L. Florence, *Vice-President*, in the Chair, with 30 Fellows (including 13 members of the Council), 19 Associates (including 1 member of the Council), 1 Hon. Associate, and several visitors, the Minutes of the Ordinary Meeting, held on Monday, 4th April 1898 [p. 302] were taken as read, and signed as correct.

A Paper by Mr. A. N. Paterson [*A.*], M.A., Godwin Bursar 1896, entitled A STUDY OF DOMESTIC ARCHITECTURE IN THE EASTERN STATES OF AMERICA IN THE YEAR 1896, having been read by the author and discussed, a vote of thanks to Mr. Paterson was passed by acclamation.

The proceedings then closed, and the Meeting separated at 10.20 P.M.